

# What Matters in AP Biology

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Biology Leadership Consortium 2017



# Do First

Independently read  
over the released Free  
Response question.

What knowledge and  
skills do students need  
to be able to  
successfully answer  
these questions?

# AP Biology (Revised 2012)

## COURSE

### Format of Assessment

**Section I: Multiple Choice** | 69 Questions | 1 Hour, 30 Minutes |  
50% of Exam Score

**Multiple-Choice: 63 Questions**

- Discrete Questions
- Questions in sets

**Grid-In: 6 Questions**

- Discrete Questions
- Questions integrate biology and mathematical skills

**Section II: Free Response** | 8 Questions | 1 Hour, 30 Minut  
(includes 10-minute reading period) | 50% of Exam Score

- Long Free Response (2 questions, one of which is lab or data-based)
- Short Free Response (6 questions, each requiring a paragraph-length argument/response)

AP Score	Recommendation
5	Extremely well qualified
4	Well qualified
3	Qualified
2	Possibly qualified
1	No recommendation



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**CONCEPTUAL  
UNDERSTANDING**

**SCIENCE  
PRACTICES**

**INQUIRY**

**ACCESS**

# Course Content



**CONTENT  
COVERAGE**



**CONCEPTUAL  
UNDERSTANDING**



**The process of evolution drives the unity and diversity of life.**

**Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.**

**BIG IDEAS**

**Living systems store, retrieve, transmit, and respond to information essential to life processes.**

**Biological systems interact, and these systems and their interactions possess complex properties.**

**The process of evolution drives the unity and diversity of life.**

**Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.**

**Living systems store, retrieve, transmit, and respond to information essential to life processes.**

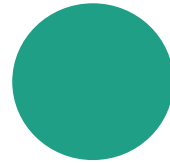
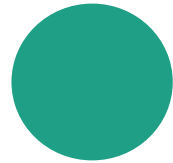
**Biological systems interact, and these systems and their interactions possess complex properties.**





# Science Practices

Use **representations** and **models** to communicate scientific phenomena and solve scientific problems



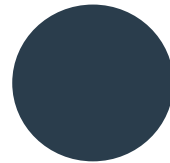
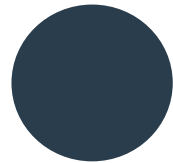
Perform **data analysis** and evaluation of evidence

Use **mathematics** appropriately



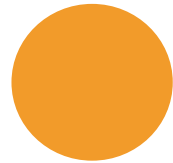
Work with **scientific explanations** and theories

Engage in scientific **questioning** to extend thinking or to guide investigations



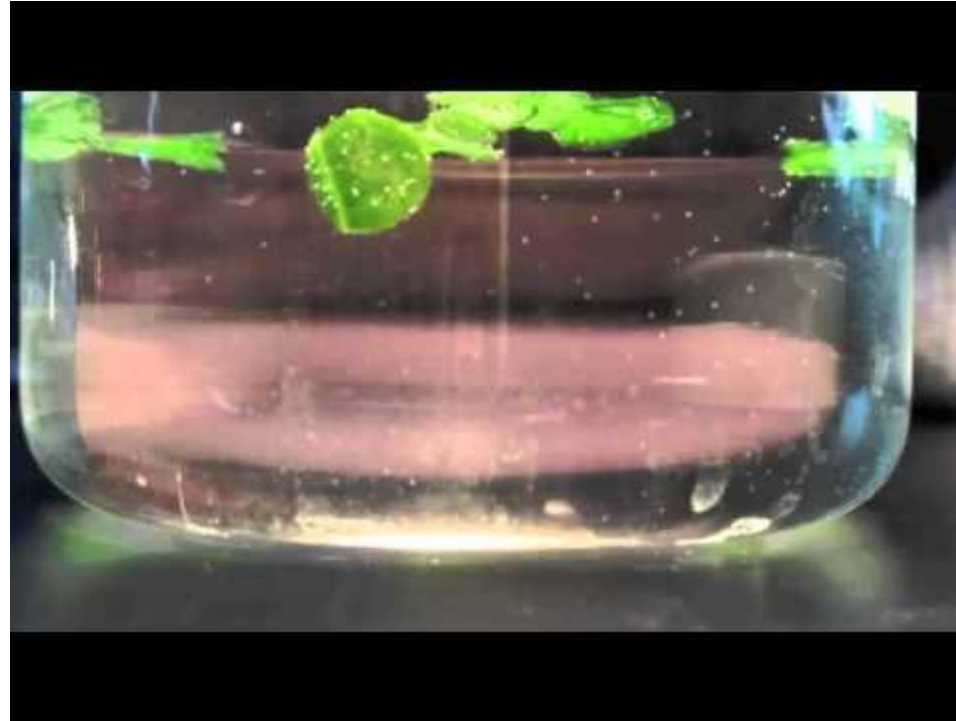
**Connect** and relate **knowledge** across various scales, concepts, and representations in and across domains

Plan and implement **data collection** strategies in relation to a particular scientific question





# Inquiry



# Increased Access to AP



# Modeling Evolutionary Change

## Part 1:

- How can we model population over time

Consider a hypothetical population with the following characteristics:

- All of the gametes go in to one big gene pool
- All of the gametes have an equal chance of taking part in fertilization (no selection)
- All zygotes live to be juveniles, all juveniles live to be adults
- There is no migration
- There is no mutation
- The population is large

## Part 2:

- How does \_\_\_\_\_ allele frequency?

# Bigger Gains for Students Who Don't Get Help Solving Problems

[Annie Murphy Paul](#) | February 25, 2014 | [11 Comments](#)

“Let them eat cake,” said Marie Antoinette. Should teachers, parents, and managers say of the learners in their charge, “Let them struggle”?



Generation 1		genotypes			
P = frequency of A		0.3			
Q = freq of B		0.7			
			AA	AB	BB
			39	255	207
		#genotype	#alleles	A	B
Gametes		Zygote	Homozygous	Heterozygous	Homozygous Recessive
B	B				
B	B				
B	B				
A	B				
A	B				
B	B				
B	B				
A	B				
B	B				
B	B				
B	B				
B	A				
B	B				
A	B	AB	0	0	1
A	B	AB	0	0	1
A	B	AB	0	0	1

Generation 2			
P = frequency of A		0.3	
Q = freq of B		0.7	
		#genotype	
Gametes		Zygote	Homozygous
		AA	
		AB	
		AB	
		AB	
		AB	
		BA	
		BB	
		BB	
		BB	
		BB	
		BB	
		AB	
A	B	AB	
B	A	BA	
A	A	AA	

- How does \_\_\_\_\_ affect allele frequencies over time?
- How do we alter our model to reflect new assumptions?
  - What conclusions can we make based on our data?

What do you want  
your incoming  
students to already  
know and be able to  
do?

